VISLA: Visual Aspects of Learning Analytics

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ABSTRACT

In this paper, we briefly describe the goal and activities of the LAK15 workshop on Visual Aspects of Learning analytics.

Categories and Subject Descriptors

H.5 [**Information Interfaces and Presentation**]: Multimedia Information Systems, User Interfaces, Group and Organization Interfaces

General Terms

Design, Experimentation, Human Factors

Keywords

learning analytics, visual analytics, information visualisation

1. WORKSHOP GOALS

The use of visualisation techniques for learning is not new. In a learning analytics context, the application of information visualisation techniques can help both teachers and learners to explore and understand relevant user traces that are collected in various (online) environments. Typical applications include dashboards [4] or tabletop visualisations that support collaborative learning [3]. Thus, such techniques can improve (human) learning.

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The goal of this workshop is to build a strong research capacity around visual approaches to learning analytics. The longer term goal is to improve the quality of learning analytics research that relies on information visualisation techniques.

2. ACTIVITIES

Authors were invited to submit original unpublished work. The following types of contributions were possible:

- Short papers (3-5 pages) that state the position of the authors within the scope of the workshop and describe solution concepts, prototypes and work in progress.
- Full papers: (8-12 pages) that describe mature work, including evaluation.

Each contribution to the workshop was asked to furthermore explicitly address the ollowing items:

1. What kind of data is being visualised? What tools were used to clean up the data (if any)?
2. For whom is it intended? This could be the learner, teacher, manager, researcher, etc.
3. How is data visualised? Which interaction techniques are applied? What tools, libraries, data formats, etc. are used? Describe the workflows and recipes used to develop the visualisation?
4. Why are the visual approaches applied (i.e. rationale behind the application of a visualisation)?
5. How has the approach been evaluated or how could it be evaluated?
6. What were the encountered problems and pitfalls during the visualisation process?

We received 7 short papers and 2 long papers. At the time of writing, the review process is proceeding.

Topics covered in the submissions illustrate the variety of approaches in the domain: tablet visualisations for self-regulated learning, tabletop visualisations for enquiry based learning, visualisations of student responses to short answer questions, visualisations of tag clusters for learning repositories, visualisations of competence graphs, the visualisation of uncertainty in predictions of course failure, the visualisation of Learning Management System logs, visualisation of collaborative writing in education, and visual analytics for discussion fora on learning how to program...

During our 1-day workshop, we aim to facilitate an interactive and engaging event where we want to avoid death by powerpoint by promoting discussion activities over presentations. In the first half of the workshop, we will therefore ask participants to shortly present the work of another submission and to relate it back to their own work. Facilitators may allocate challengers per presentation to move the discussion around common themes and differences in approaches.

During the second half of the workshop, we will invite the participants to share their tools, workflows and recipes in a hands on discussion session so that they can benefit from each others' knowledge, apply their visual approaches on either their own dataset or on the dataset that we provide.

Finally, we will move the discussion to the final topic of the workshop, which is the development of the equivalent of the VAST challenge for learning [1], which will be linked back with the LAK14 and LAK15 data challenge [2]. To get this discussion going, we will invite a keynote speaker with direct experience in VAST.

As [1] mentions:

> The annual Visual Analytics Science and Technology (VAST) challenge provides Visual Analytics researchers, developers, and designers an opportunity to apply their best tools and techniques against invented problems that include a realistic scenario, data, tasks, and questions to be answered. Submissions are processed much like conference papers, contestants are provided reviewer feedback, and excellence is recognized with awards. A day-long VAST Challenge workshop takes place each year at the IEEE VAST conference to share results and recognize outstanding submissions.

3. RELATED WORKSHOPS

Three related editions of our workshop around the theme of applying visual approaches in TEL and in learning analytics were held at EC-TEL 2011 (`https://sites.google.com/site/advtel2011/`), at Learning Analytics Summer Institute (LASI14) in Cambridge, MA, USA (`http://solaresearch.org/conferences/lasi/lasi2014/`) and at the JTEL summer school 2013 (`http://www.prolearn-academy.org/Events/summer-school-2013`).

4. CONCLUSION

We believe that an initiative similar to VAST for learning analytics data sets would help to build up research capacity around visual aspects of learning analytics.

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6. REFERENCES

[1] K. Cook, G. Grinstein, and M. Whiting. The VAST challenge: history, scope, and outcomes: An introduction to the special issue. *Information Visualization*, 13(4):301–312, 2014.

[2] H. Drachsler, S. Dietze, E. Herder, M. d'Aquin, and D. Taibi. The learning analytics & knowledge (LAK) data challenge 2014. In *Proceedings of the Fourth International Conference on Learning Analytics And Knowledge*, LAK '14, pages 289–290, New York, NY, USA, 2014. ACM.

[3] R. Martinez-Maldonado, Y. Dimitriadis, A. Martinez-Monés, J. Kay, and K. Yacef. Capturing and analyzing verbal and physical collaborative learning interactions at an enriched interactive tabletop. *International Journal of Computer-Supported Collaborative Learning*, 8(4):455–485, 2013.

[4] K. Verbert, S. Govaerts, E. Duval, J. Santos, F. Assche, G. Parra, and J. Klerkx. Learning dashboards: an overview and future research opportunities. *Personal and Ubiquitous Computing*, 18(6):1499–1514, 2014.